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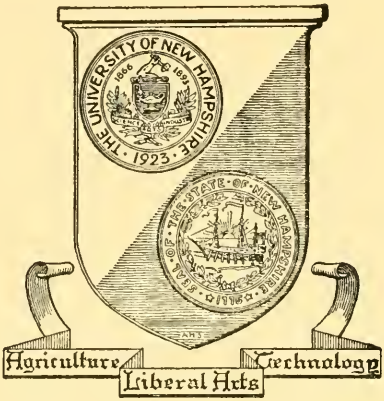

The University
of
New Hampshire

Bulletin 366 August, 1946

THE UNIVERSITY OF NEW HAMPSHIRE

AGRICULTURAL EXPERIMENT STATION

Department of Agricultural and Biological Chemistry

Inspection of Commercial Fertilizers

Made for the

STATE DEPARTMENT OF AGRICULTURE

T. O. Smith and H. A. Davis

THE UNIVERSITY OF NEW HAMPSHIRE

DURHAM, N. H.

INSPECTION OF COMMERCIAL FERTILIZERS

Made for the

State Department of Agriculture

The inspection of commercial fertilizers reported in this bulletin was made under the direction of the Honorable Andrew L. Felker, Commissioner of Agriculture. Mr. C. A. Lyon, Fertilizer Control Supervisor, and Mr. George Laramie, Inspector, collected samples of 63 brands of fertilizer and fertilizer materials which were offered for sale by dealers or had been delivered to consumers during the year ending June, 1946. The general character of the brands sampled is shown by the following classification:

Complete fertilizer	46
Phosphoric acid and potash	3
Superphosphate	6
Nitrate of soda	1
Ammonium nitrate (Nitraprills)	1
Muriate of potash	1
Natural manures	5

THE FERTILIZER LAW

The purchaser of a fertilizer should familiarize himself with the full text of the fertilizer law. He should not accept from the dealer any bag of fertilizer which is not tagged and guaranteed in compliance with the law. The law governing these matters is as follows:

"Every lot or parcel of commercial fertilizer or fertilizer material sold or offered or exposed for sale within this state shall be accompanied by a plainly printed statement, clearly and truly certifying the number of net pounds of fertilizer in the package; the name, brand or trademark under which the fertilizer is sold; the name and address of the manufacturer or importer; the location of the factory; and a chemical analysis stating the minimum percentage of nitrogen, of available phosphoric acid and of water-soluble potash expressed in whole numbers.

"No fertilizer or fertilizer material containing the three essential fertilizing elements, nitrogen, phosphoric acid and potash may be sold or offered for sale if the total minimum plant food nutrients contained therein is less than fourteen per cent by weight, provided however that natural animal and bird manures shall be excepted from the provisions of this section."

The state official charged with the enforcement of the fertilizer law is the Commissioner or Agriculture. Copies of the full text of the law may be obtained from his office in Concord. All inquiries concerning the law and all matters relative to the registration of brands should be addressed to his office.

The chief purpose of the official inspection required by the fertilizer law is to protect the consumer against the misbranded products which doubtless would soon appear on the market if the sale of fertilizer was not under state regulation. The value of a fertilizer depends mainly upon its content of available plant food, particularly nitrogen, phosphoric acid, and potash. The presence of these constituents can be determined only by a chemical analysis. To insure that they are being furnished by all manufacturers in the guaranteed amounts, it is considered

necessary that each brand of fertilizer offered for sale be officially inspected and analyzed one or more times each year. When failure to meet the guarantee is proved by chemical analysis, the prosecution or seizure provisions of the law may be invoked. The purchaser's refusal to buy a fertilizer which does not conform to the law in every respect will not only assist in the enforcement of the law but will at the same time insure himself the protection of the law. If the buyer fails to assure himself the legal requirements have been met, he accepts the fertilizer at his own risk.

USE OF COMMERCIAL FERTILIZERS

This bulletin is concerned with the enforcement of the fertilizer law. It is not within its scope to make recommendations regarding the use of commercial fertilizers. The Department of Agronomy and the Department of Agricultural and Biological Chemistry of the University of New Hampshire Agricultural Experiment Station test soils and conduct experimental work with various fertilizer materials on hay and crop land. The Department of Horticulture does considerable experimenting to determine the best fertilizer treatments for fruits and vegetables. Much of this work has been published, and is available for free distribution to residents of New Hampshire. Address your request to Mail Service, University of New Hampshire, Durham, New Hampshire.

Sta. Cir. 47	Fertilizer Experiments with Sweet Clover. 12 pp.
Sta. Cir. 50	Fertilizer Experiments with Hay Lands in the Connecticut Valley. 15 pp.
Sta. Cir. 58	Fertilizer Needs of Alfalfa on New Hampshire Soils. 12 pp.
Sta. Cir. 61	Fertility Needs of Dairy Farm Crops in the Connecticut Valley. 12 pp.
Sta. Cir. 63	Fertilizers for Sweet Corn. 8 pp.
Ext. Cir. 65	Worn-Out Hay Lands. 4 pp.
Ext. Cir. 147	Top-Dressing Hay Lands. 4 pp.
Ext. Cir. 210	Purchasing Lime and Fertilizer. 12 pp.
Ext. Cir. 248	Wartime Fertilizers. 4 pp.
Sta. Bull. 306	Experiments with Grass Hay. 24 pp.
Sta. Bull. 320	Pasture Top-Dressing in New Hampshire. 24 pp.
Sta. Cir. 59	Effect of Soil Moisture and Fertilizer Placement on Vitality of the Potato Seed Piece. 11 pp.
Sta. Bull. 326	Studies of Pasture Management. 24 pp.
Ext. Bull. 59	The Apple Orchard in New Hampshire. 39 pp.
Ext. Cir. 264	Red Raspberry Culture. 4 pp.
Ext. Cir. 104	Blackberries for New Hampshire. 4 pp.
Ext. Cir. 148	Improving the Home Orchard. 4 pp.
Ext. Cir. 173	Grape Growing in New Hampshire. 11 pp.
Ext. Cir. 211	Strawberry Culture. 4 pp.
Ext. Cir. 215	Improved Blueberries. 12 pp.
Ext. Bull. 65	Home Fruit Growing in New Hampshire. 16 pp.
Ext. Cir. 266	Root Crops. 20 pp.
Ext. Bull. 45	Potato Growing in New Hampshire. 32 pp.
Sta. Bull. 324	Experiment with Potatoes. 38 pp.
Ext. Cir. 99	Asparagus Culture. 4 pp.
Ext. Cir. 170	The Home Vegetable Garden. 20 pp.
Ext. Cir. 212	Cabbage. 4 pp.
Ext. Cir. 213	Squash. 4 pp.

Ext. Cir. 220 Tomatoes for Good Health. 8 pp.
Sta. Bull. 362 Purchasing Fertilizers in New Hampshire. 31 pp.

While the word fertilizer does not appear in all the above titles, no publication is included which does not discuss some aspect of the use of fertilizer.

CONFORMITY TO GUARANTEE

The chemical analyses were made by the methods of the Association of Official Agricultural Chemists. No sample was drawn from less than 10 bags. Forty-two of the 63 brands analyzed equaled or exceeded the manufacturer's guarantee. No brand failed to meet the guarantee in all of the three constituents, total nitrogen, available phosphoric acid, and water-soluble potash. Four brands were below guarantee in two of the three constituents, one in nitrogen and available phosphoric acid, two in nitrogen and potash, and one in available phosphoric acid and potash. Seventeen brands failed to meet the guarantee in only one constituent.

Including all the brands referred to above, seven brands were found to contain less than the guaranteed amount of nitrogen. The greatest deficiency was 0.50 per cent. The average of the other six deficiencies was 0.16 per cent. Eight brands failed to meet the guarantee in available phosphoric acid. One brand was deficient 2.56 percent. The average of the other seven deficiencies was 0.46 per cent. Ten brands contained less potash than was guaranteed. One was deficient 1.25 per cent. The average of the other nine deficiencies was 0.49 per cent.

Seven brands were guaranteed to contain magnesium oxide. Only one failed to meet the guarantee.

In the tabulation of the analyses in the following pages deficiencies of one-fourth of one per cent or more are shown in bold-face type. The manufacturers are arranged alphabetically. The brand name is listed alphabetically, or numerically by formula, under the manufacturer.

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Found	Guaranteed
American Agricultural Chemical Co. North Weymouth, Mass.										
Agrico Country Club 6-10-4	6.00	6.02	....	10.98	10.00	10.02	4.00	4.26	....	....
Agrico for Corn 3-12-6	3.00	3.02	....	13.04	12.00	**11.60**	6.00	5.80	....	....
Agrico for Corn 4-12-8	4.00	4.16	....	12.94	12.00	**11.23**	8.00	8.03	....	....
Agrico for Gardens 5-10-5	5.00	5.10	....	11.68	10.00	7.44	5.00	5.22	....	....
Agrico for New England 5-8-7	5.00	5.01	....	9.71	8.00	8.13	7.00	**6.67**	....	....
Agrico for New England 5-8-7	5.00	5.02	....	9.04	8.00	7.89	7.00	7.21	....	....
Agrico for Potatoes 5-10-10	5.00	5.15	....	11.21	10.00	**9.69**	10.00	10.01	....	....
Agrico for Seeding Down 4-12-16	4.00	4.12	....	13.08	12.00	12.08	16.00	16.14	....	....
Agrico for Top Dressing 7-7-7	7.00	6.92	....	8.36	7.00	7.06	7.00	7.01	....	....
Agrico Pulverized Sheep Manure	1.25	1.57	....	1.26	1.00	1.06	3.00	**1.75**	....	....
18% Normal Superphosphate	....	....	....	18.40	18.00	18.04	....	....	....	....
Apothecaries Hall Co. Waterbury, Conn.										
Liberty 4-12- 4	4.00	4.16	....	12.76	12.00	12.20	4.00	4.12	....	....
Liberty 5- 8- 7	5.00	5.33	....	9.16	8.00	8.40	7.00	7.31	....	....
Liberty 5-10- 5	5.00	5.24	....	11.24	10.00	10.60	5.00	5.33	....	....
Liberty 5-10-10	5.00	5.20	....	11.46	10.00	10.84	10.00	11.33	....	....
Liberty Superphosphate 20%	....	....	....	21.15	20.00	20.26	....	....	....	....
Armour Fertilizer Works Carteret, N. J.										
Armour's 5-10-10	5.00	5.02	....	11.00	10.00	10.06	10.00	**9.60**	....	....

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Found	Guaranteed
Armour's Big Crop — Corn 4-12-8	4.00	4.26	....	12.54	12.00	12.05	8.00	8.10	....	....
Armour's Big Crop — Top Dressing 7-7-7	7.00	7.01	....	8.42	7.00	7.58	7.00	6.38	....	....
Armour's Big Crop — Vegetables 5-8-7	5.00	4.92	....	10.96	8.00	8.18	7.00	6.03	....	....
Armour's Pulverized Sheep Manure	1.50	1.62	....	1.36	1.00	1.19	2.50	3.32	....	....
Armour's Special Ornamental 6-12-4	6.00	6.29	....	12.74	12.00	12.24	4.00	4.15	....	....
Armour's Superphosphate 20%	....	....	....	20.45	20.00	20.09	....	....	....	....
Ashcraft-Wilkinson Co. Atlanta, Ga.										
Nitraprills	33.50	33.53	....	....	....	....	....	....	....	....
Atkins and Durbrow New York, N. Y.										
Driconure	2.00	2.92	....	2.48	1.00	2.26	1.00	1.80	....	....
Berkshire Chemical Co. Bridgeport, Conn.										
Berkshire 0-14-14	....	....	....	14.56	14.00	14.14	14.00	13.77	....	....
Berkshire 4-12- 4	4.00	4.33	....	13.07	12.00	12.41	4.00	4.52	....	....
Berkshire 5- 8- 7	5.00	5.11	....	8.49	8.00	8.09	7.00	7.07	....	....
Berkshire 5-10-10	5.00	5.14	....	10.42	10.00	10.02	10.00	10.41	....	....

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Found	Guaranteed
Buell Fertilizer Co. Exeter, N. H.										
Buell Peat-Poultry Manure	3.00	3.42	....	2.87	3.00	2.59	1.50	1.83	....	....
Chilean Nitrate Sales Corp. New York, N. Y.										
Champion Nitrate of Soda	16.00	16.10	....	....	....	....	....	....	....	....
Consolidated Rendering Co. Boston, Mass.										
Corenco 4-12- 4	4.00	4.01	....	13.26	12.00	12.04	4.00	4.28	....	....
Corenco 8-12-16-1½	8.00	7.86	....	12.81	12.00	12.11	16.00	15.02	1.50	4.96
Corenco Peerless Potato 5-10-10	5.00	5.15	....	11.08	10.00	10.12	10.00	10.26	....	....
Corenco Potato and General Crop 5-8-7	5.00	5.10	....	9.06	8.00	8.28	7.00	7.05	....	....
Corenco Superphosphate 20	....	....	....	19.85	20.00	19.49	....	....	....	....
Corenco Top Dresser 0-14-14	....	....	....	14.47	14.00	14.06	14.00	14.18	....	....
Eastern States Farmers' Exchange West Springfield, Mass.										
Eastern States 5-10-10	5.00	5.11	....	11.32	10.00	10.50	10.00	10.04	....	....
Eastern States 5-15- 5	5.00	5.42	....	16.90	15.00	16.10	5.00	5.11	....	....
Eastern States 6-18-18	6.00	6.71	....	18.74	18.00	18.32	18.00	19.21	....	....

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
Eastern States 8-16-16-1	8.00	8.03	....	17.01	16.00	16.45	16.00	16.28	1.00	1.92
Eastern States 8-24- 8	8.00	8.37	....	24.45	24.00	24.15	8.00	8.85	....	....
Eastern States 10-10-10-1	10.00	9.50	....	11.42	10.00	10.86	10.00	10.59	1.00	0.62
Eastern States Superphosphate 20%	....	....	....	20.95	20.00	20.45	....	....	....	....
Victory Garden 5-10-5-2	5.00	5.54	....	10.87	10.00	10.41	5.00	5.84	2.00	2.97
International Minerals and Chemical Corp. Woburn, Mass.										
International 0-14-14	....	....	....	16.08	14.00	15.18	14.00	13.76	....	..
International 5- 8- 7	5.00	5.23	....	8.99	8.00	8.41	7.00	7.18	....	....
International 5-10-10	5.00	5.24	....	11.08	10.00	10.12	10.00	10.35	....	....
International 7- 7- 7	7.00	6.68	....	8.17	7.00	7.75	7.00	7.30	....	....
International 8- 6- 2	8.00	8.02	....	6.86	6.00	6.02	2.00	2.77	....	....
International 8-16-16-1½	8.00	8.06	....	16.28	16.00	16.12	16.00	16.33	1.50	1.52
International Fruit 7- 7- 7-3	7.00	7.04	..	7.74	7.00	7.06	7.00	8.60	3.00	3.48
International Potash 60%	....	....	....	....	....	....	60.00	60.16	....	....
International Potato 5-10-10-2	5.00	5.20	..	10.66	10.00	10.12	10.00	10.21	2.00	11.77
International Superphosphate 20	....	....	....	21.75	20.00	20.18	....	....	....	....
Lowell Rendering Co. Lowell, Mass.										
Merrimack 4-12- 4	4.00	4.09	....	13.44	12.00	12.08	4.00	4.10	....	....
Merrimack 5- 8- 7	5.00	5.28	....	8.38	8.00	8.01	7.00	7.30	....	....
Merrimack 5-10-10	5.00	5.11	....	11.48	10.00	10.26	10.00	9.56	....	....
Merrimack 7- 7- 7	7.00	6.90	....	7.62	7.00	7.06	7.00	7.24	....	....

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Found	Guaranteed
Merrimack Farmers' Exchange Concord, N. H.										
Merrimack 4-12-12	4.00	4.11	....	12.88	12.00	12.25	12.00	12.51	....	....
Harold L. Norwood North Reading, Mass.										
Norwood Sheep Manure	1.83	1.60	....	0.27	0.89	0.17	1.03	1.55	..	....
Rogers & Hubbard Co. Portland, Conn.										
Red H 5-10-10	5.00	5.24	....	10.52	10.00	10.16	10.00	10.39	....	....
Swift & Co. Fertilizer Works Baltimore, Md.										
Victory Garden Vigoro 4-12-4	4.00	4.36	....	12.62	12.00	12.10	4.00	4.29	....	....